

A black and white photograph of the iconic Iwo Jima flag-raising scene. Several Marines are seen in silhouette, struggling to hoist a large American flag onto a tall pole against a bright, hazy sky. The flag is partially unfurled, showing the stars and stripes. The scene is set on a rocky, uneven terrain.

# **USMC UPDATE**

## **AFEB Winter 2004**

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# **Malaria Outbreak**

## **August 2003**

- Marines of the 26<sup>th</sup> Marine Expeditionary Unit assigned to the Iwo Jima Amphibious Ready Group ordered to provide security during engineering repairs conducted at Roberts International Airport, Monrovia, Liberia.
- Marine Quick Reaction Force assigned mission.



# Medical Investigation

- These are the results of a epidemiological investigation conducted immediately following the outbreak.
- Etiology of outbreak.
- Determine whether future operation possible without similar outbreak.



# Organizations Represented

- Food and Drug Administration
- Centers for Disease Control and Prevention
- World Health Organization
- Walter Reed Army Institute for Research
- Naval Medical Research Center
- Armed Forces Medical Intelligence Center
- U.S. Air Force Medical Support Agency
- Joint Chiefs of Staff - J4
- Uniformed Services University of the Health Sciences
- Naval Medical Education and Training Command
- DoD Global Emerging Infections System
- Marine Forces, Atlantic
- II Marine Expeditionary Force
- National Naval Medical Center
- Naval Environmental Health Center
- Naval Environmental and Preventive Medicine Unit - Sicily
- Headquarters, Marine Corps, PP&O
- Commander Amphibious Task Force
- Marine Expeditionary Unit 26
- Navy Disease Vector Ecology and Control Center
- Naval Forces Europe
- Joint Task Force - Liberia
- U.S. Army Medical Research and Materiel Command
- Navy Bureau of Medicine
- Headquarters, Marine Corps, Health Services
- U.S. Army Office of the Surgeon General



# Defined Populations

- Joint Task Force – 290 spent some time ashore.
- Quick Reaction Force (QRF) – 225 Marines.
- Members of QRF surveyed – 157.
- Mefloquine serum levels – 135 (133).



# Sequence of Events

- Marines ashore 14-26 August 2003.
- 26 Aug – vague symptoms HA, fever, chills, abdominal pain in majority of Marines. Malaria suspected.
- Symptoms resolve in 48-72 hours with and without therapy.
- 3 Sept – recurrence of symptoms.



# Sequence of Events

- 4 Sept – suspicion of outbreak, unknown etiology, request assistance.
- 2 Marines worsen, hypotension, abnormal blood, kidney and liver studies.
- Malaria confirmed by peripheral smear.
- 6 Sept – 31 others identified and evacuated.
- 7 Sept – 10 more cases evacuated.



# Total Cases Identified

- 80 Cases treated.
  - 71 Marines
  - 7 Navy
  - 1 Army
  - 1 civilian
- 51 with positive smear, 29 by clinical criteria.



# Attack Rates

- AFMIC prediction for unprotected personnel in Liberia – 11-50%.
- 44% attack rate for those sleeping ashore.
- 28% attack rate for those spending any time ashore.



# Issues and Answers

- Generic mefloquine used – FDA determined formulation and potency adequate.
- Compliance with mefloquine – 7 of 133 had both protective mefloquine level and evidence of steady-state levels.
- Parasite not resistant to mefloquine.



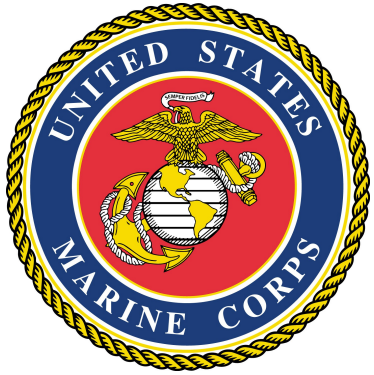
# Protective Measures

- DEET use – long acting formula available.
  - 27% used DEET at least once.
- Permethrin-treated uniforms
  - 12% had these available ashore.
- Bed nets
  - Not available ashore.



# Improvement Efforts

- Permethrin treat uniforms at factory level.
  - Permanent press treatment
  - NSN assignment
- Refresher training for medical staff prior to deployment.
- Procure improved mosquito net system.



# Self Supporting Bednet

- No reliance on cot for use
- Lighter weight





# Future Efforts

- Add Malarone and quinine to shipboard pharmacy.
- Rapid serological test for malaria.
- Malaria vaccine research.



# Questions?

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